UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,131	09/25/2003	Lothar Benedict Erhard Josef Moeller	Moeller 17 (LCNT/125631)	7293

46363 7590 03/09/2007
PATTERSON & SHERIDAN, LLP/
LUCENT TECHNOLOGIES, INC
595 SHREWSBURY AVENUE
SHREWSBURY, NJ 07702

EXAMINER	
MALKOWSKI, KENNETH J	
ART UNIT	**PAPER NUMBER**
2613	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/09/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)
	10/671,131	MOELLER, LOTHAR BENEDICT ERHARD JOSEF
	Examiner	Art Unit
	Kenneth J. Malkowski	2613

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 January 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-11 and 13-18* is/are rejected.

7)☐ Claim(s) *12* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 November 2004* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Drawings

1. The drawings shown in Figure 2 (a) and (b) are objected to because they are not readable. Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claim 1, 5-10 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,718,121 to Epworth et al. in view of U.S. Patent Application Publication No. 2004/0120356 to Davenport et al.

With respect to claims 1 and 16-18, Epworth discloses a heterodyne receiver (balanced coherent detector, title) comprising: a tunable oscillator circuit for outputting a predetermined local oscillation frequency signal (LO, Figures 1-7 (local oscillator)) to a frequency mixer (coupler, figures 1-7)(column 2 lines 45-49 (fused coupler))(applicant states on page 4 lines 13-16 that the frequency mixer can be a fused coupler)); said frequency mixer for mixing an input data signal and said predetermined local oscillation frequency signal and outputting substantially similar mixed signals on at least two separate paths (Figure 4 depicts the mixed signals are sent on two paths, one to PD1 and another to PD2)(column 2 lines 50-52 (products of the combiner are sent to optical detectors PD1 and PD2)); a current comparing means for comparing said mixed signals and generating a voltage value indicative of a difference in current within said at least two separate paths (Differential amplifier DA, provides a voltage value indicative of a difference in current at electrical output, figure 4). However, Epworth fails to disclose the remaining signal processing that typically occurs in such a receiver including post amplification and logic signal production. Davenport, from the same field of endeavor, discloses a post amplification and logic signal production circuit at a receiver (Figures 5-9)(page 2 paragraphs 15-19) including a gain clipped post amplifier (page 5 paragraph 43 (amplification occurs across several states with the goal of performing threshold limiting by amplifying the signal to the rails of the amplifier))(Full wave rectifier, Figure 6) for amplifying said voltage value (page 5 paragraph 43 (full wave rectifier provides amplification)) of a generated baseband signal (page 5

paragraph 43 (input to the full-wave rectifier is a bipolar periodic signal whose frequency is near the nominal center frequency of the modulation frequency)); and a decision circuit for receiving said baseband signal and producing a resultant logic signal (comparator, Figure 9)(page 6 paragraph 46 (comparator in receiver circuitry is utilized as a threshold detector for conversion to logic level)). Therefore, it would have been obvious to one of ordinary skill in the art to implement the post amplification and logic signal production circuit as taught by Davenport in the receiver as taught by Epworth. The motivation for doing so would have been to create discernable binary data to be used by data processing at the receiver.

With respect to claim 5, Epworth in view of Davenport disclose the heterodyne receiver of claim 1, wherein said frequency mixer comprises a 3 dB coupler (Epworth: column 2 lines 45-50 (fused coupler))(Epworth: column 2 lines 5-10 (balance to the photo detectors is optimized)).

With respect to claim 6, Epworth in view of Davenport disclose the heterodyne receiver of claim 1, wherein said current comparing means comprises two photodiodes (Epworth: PD1, PD2, Figure 4) and a differential amplifier (Epworth: Differential amplifier, Figure 4).

With respect to claims 7 and 10, Epworth in view of Davenport disclose the heterodyne receiver of claim 1, wherein said gain clipped post amplifier is operated in saturation (Davenport: page 5 paragraph 43 (amplification occurs across several states with the goal of performing threshold limiting by amplifying the signal to the rails of the amplifier)).

With respect to claim 8, Epworth in view of Davenport disclose the heterodyne receiver of claim 1, wherein said decision circuit produces a logic high output if said baseband signal is higher than a predetermined threshold and produces a logic low output if said baseband signal is

lower than a predetermined threshold (Davenport: page 6 paragraph 46 (comparator compares the output voltage to a fixed reference level, and outputs a logic 0 in case the threshold is exceeded and a 1 otherwise)).

With respect to claim 9, Epworth in view of Davenport disclose the heterodyne receiver of claim 1, further comprising at least one respective delay line (Epworth: column 3 lines 11-14 (path delays reasonably matched)) and at least one respective attenuator in each of said at least two separate paths (Figure 7C, Pot1, Pot2 are adjust potentiometers) for making the signal propagation time and loss in said at least two separate paths substantially equal (Epworth: column 2 lines 5-10 (optimize balance between two paths))(Epworth: column 4 lines 12-15 (adjust relative gain between two paths)).

4. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,718,121 to Epworth et al. in view of U.S. Patent Application Publication No. 2004/0120356 to Davenport et al. and further in view of U.S. Patent No. 7,092,645 to Sternowski et al.

With respect to claim 2, Epworth in view of Davenport disclose the heterodyne receiver of claim 1, however, they fail to specifically disclose a low-pass filter in said receiver. Despite this, low pass filtering is a very well known advantageous feature to have in the art and is not a patentably distinct limitation. Sternowski, from the same field of endeavor discloses a heterodyne receiver (column 4 lines 35-36)(Figure 4) further comprising a low-pass filter (720, Figure 4) for filtering said baseband signal (Figure 7 shows output of lpf 720 states "receive baseband out"). Therefore, it would have been obvious to one of ordinary skill in the art to implement the low pass filtering as disclosed by Sternowski into the heterodyne receiver as disclosed by Epworth in view of Davenport. The motivation for doing so would have been to

provide additional baseband processing by blocking the local oscillation frequency and passing the baseband signal (Sternowski: column 6 lines 28-35).

5. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,718,121 to Epworth et al. in view of U.S. Patent Application Publication No. 2004/0120356 to Davenport et al. and further in view of O'Rourke et al.

With respect to claim 3, Epworth in view of Davenport disclose the heterodyne receiver of claim 1, however fail to expressly disclose that the low-pass filter comprises an SMA connector. Despite this, SMA connectors are extremely well known in the art and are not considered a patentably distinct limitation. O'Rourke, from the same field of endeavor discloses a filter with an SMA connector used in a fiber optic setting. Therefore, it would have been obvious to one of ordinary skill in the art to implement a filter using an SMA connector as disclosed by O'Rourke into the filter arrangement as disclosed by Epworth in view of Davenport. The motivation for doing so would have been that SMA connectors are notoriously well known in the art and have well known advantages of low production costs, high industry usage, excellent electrical performance and offer simple and precise phase adjustment means.

6. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,718,121 to Epworth et al. in view of U.S. Patent Application Publication No. 2004/0120356 to Davenport et al. and further in view of U.S. Patent No. 6.907,052 to Kozlowski et al.

With respect to claim 4, Epworth in view of Davenport disclose the heterodyne receiver of claim 1, however fail to specifically disclose said tunable oscillator circuit comprises a fast switchable laser. Fast switchable lasers for use in oscillation circuitry are known in the art and do

not constitute a novel limitation. Kozlowski, from the same field of endeavor discloses a local oscillator that has a tunable optical laser (title) that is specifically meant for optical heterodyne signal detection (abstract). Kozlowski teaches that his invention of a fast tunable laser within a local oscillator can be used in a receiver side implementation (column 6 lines 58-67 (the tunable local oscillator provides an optical signal that can be rapidly tuned around a selectable wavelength and can be used as part of a communication receiver)). Therefore, it would have been obvious to one of ordinary skill in the art to implement the fast switchable laser as taught by Kozlowski in the receiver side local oscillator as taught by Epworth in view of Davenport. The motivation for doing so would have been to create improved sensitivity and increased channel capacity for heterodyne detection (Kozlowski: column 1 lines 18-21), increased accuracy of the local oscillator and therefore improved performance of the heterodyne detection system (Kozlowski: column 1 lines 21-25), and to reduce complexity of local oscillator system (Kozlowski: column 1 lines 26-31).

7. Claims 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,718,121 to Epworth et al. in view of U.S. Patent Application Publication No. 2004/0120356 to Davenport et al. and further in view of U.S. Patent No. 6,691,973 to Huber et al.

With respect to claim 11, Epworth discloses and at least one receiver for receiving at least one optical signal an optical channel, each of said at least one receivers comprising: a tunable oscillator circuit for outputting a predetermined local oscillation frequency signal (LO, Figures 1-7 (local oscillator)) to a frequency mixer (coupler, figures 1-7)(column 2 lines 45-49 (fused coupler))(applicant states on page 4 lines 13-16 that the frequency mixer can be a fused

coupler)); said frequency mixer for mixing an input data signal and said predetermined local oscillation frequency signal and outputting substantially similar mixed signals on at least two separate paths (Figure 4 depicts the mixed signals are sent on two paths, one to PD1 and another to PD2)(column 2 lines 50-52 (products of the combiner are sent to optical detectors PD1 and PD2)); a current comparing means for comparing said mixed signals and generating a voltage value indicative of a difference in current within said at least two separate paths (Differential amplifier DA, provides a voltage value indicative of a difference in current at electrical output, figure 4). However, Epworth fails to disclose the remaining signal processing that typically occurs in such a receiver including post amplification and logic signal production. Davenport, from the same field of endeavor, discloses a post amplification and logic signal production circuit at a receiver (Figures 5-9)(page 2 paragraphs 15-19) including a gain clipped post amplifier (page 5 paragraph 43 (amplification occurs across several states with the goal of performing threshold limiting by amplifying the signal to the rails of the amplifier))(Full wave rectifier, Figure 6) for amplifying said voltage value (page 5 paragraph 43 (full wave rectifier provides amplification)) of a generated baseband signal (page 5 paragraph 43 (input to the full-wave rectifier is a bipolar periodic signal whose frequency is near the nominal center frequency of the modulation frequency)); and a decision circuit for receiving said baseband signal and producing a resultant logic signal (comparator, Figure 9)(page 6 paragraph 46 (comparator in receiver circuitry is utilized as a threshold detector for conversion to logic level)). Therefore, it would have been obvious to one of ordinary skill in the art to implement the post amplification and logic signal production circuit as taught by Davenport in the receiver as taught by Epworth.

The motivation for doing so would have been to create discernable binary data to be used by data processing at the receiver.

Furthermore, Epworth in view of Davenport fail to disclose said receiver is within an optical transmission system with a plurality of transmitters utilizing splitters and combiners. However, such transmission systems utilizing heterodyne detection systems are commonly known in the art. Huber, form the same field of endeavor discloses a plurality of optical transmitters (12, Figure 2); a multiplexer for combining the optical channels of said optical transmitters (18, Figure 2); a power splitter for splitting said combined optical channels (20, Figure 2)(column 6 lines 1-11 (optical distributor can be a WDM splitter)). Therefore, it would have been obvious to one of ordinary skill in the art to implement the full transmission system as disclosed by Huber with the receiver as disclosed by Epworth in view of Davenport. The motivation for doing so would have been the suggestion provided by Epworth that the balanced coherent receiver was meant for use in an optical communication system (column 1 lines 5-7).

With respect to claim 13, Epworth in view of Davenport and further in view of Huber disclose the optical switch fabric of claim 11, further comprising an amplifier for amplifying said combined optical channels (Huber: 22, Figure 1).

8. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,718,121 to Epworth et al. in view of U.S. Patent Application Publication No. 2004/0120356 to Davenport et al. and further in view of U.S. Patent No. 6,691,973 to Huber et al. and further in view of U.S. Patent Application Publication No. 2004/0047561 to Tuda et al.

With respect to claim 14, Epworth in view of Davenport and further in view of Huber disclose the optical switch fabric of claim 11, however fails to disclose polarizing combined optical channels. Despite this, polarization of combined optical channels is well known in the art and is not considered a patentably distinct limitation. Tuda, from the same field of endeavor discloses polarizing a group of combined optical channels (page 18 paragraph 395 (the configuration polarizes wavelength multiplexed optical signals of ten-odd waves)). Therefore, it would have been obvious to one of ordinary skill in the art to combine implement the polarization of combined channels as disclosed by Tuda into the system as disclosed by Epworth in view of Davenport and further in view of Huber. The motivation for doing so would have been to ensure that all optical channels are received with a uniform polarization thus simplifying optical receivers of individual channels.

9. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,718,121 to Epworth et al. in view of U.S. Patent Application Publication No. 2004/0120356 to Davenport et al. and further in view of U.S. Patent No. 6,691,973 to Huber et al. and further in view of U.S. Patent Application Publication No. 2002/0126346 to Suzuki et al.

With respect to claim 15, Epworth in view of Davenport and further in view of Huber disclose the optical switch fabric of claim 11, however, fail to disclose a central clock distribution unit and delay lines. Suzuki, from the same field of endeavor discloses a central clock distribution unit (page 2 paragraph 25 (pulse light generator generates respective optical trains with the clock output of the clock generator)) and delay lines (page 4 paragraph 47)(38-1-38-4, Figure 3). Therefore, it would have been obvious to one of ordinary skill in the art to implement the clock distribution/ delay line setup as disclosed by Suzuki in the optical

transmission system as disclosed by Epworth in view of Davenport and further in view of Huber. The motivation for doing so would have been to create a multiplex a plurality of signals at a high bit rate and to create more stable operation (Suzuki: page 1 paragraph 12).

Allowable Subject Matter

10. Claim 12 is objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

11. Applicant's arguments filed 1/3/2007 have been fully considered but they are not persuasive. On page 7 paragraph 3 applicant states that the drawings are legible "as is." Applicant submits that Figures 2(a)-(b) reflect the nature of the data and are not illegible. However, there is evidence that the data in Figures 2(a)-(b) is not accurately reflecting the data that was meant to be displayed and is therefore not legible "as is." On page 7 paragraph 1 applicant states that "a three level diagram is visible, where the outer traces with larger intensity represent the boundaries of the Ug(t) oscillation when a logical high is transmitted and the horizontal trace in the middle of the eye stems form the logical lows. However, none of these details are actually visible on Figures 2(a) or 2(b). Furthermore, applicant states that, "the advantage of gain clipping is clearly visible in Figure 2b. However, the only thing clearly visible in Figure 2b is a large gray rectangular shaded region. This indicates to the examiner that new drawings need to be submitted.

On page 9 of remarks applicant states that there is nothing in Epworth to suggest any deficiencies in the balanced signal of the receiver requiring modifications or components from

Davenport and because of this, there is no motivation to combine Epworth and Davenport. However, the claim as rejected was used to provide a reference for ***post*-amplification**. In the field of fiber optics it is known that post amplification refers to amplification that occurs after the initial optical to electrical conversion, in this case at the differential amplifier. The Epworth reference does not include post amplification after the differential amplifier. Even if Epworth does not provide a motivation as asserted by applicant, this is not necessary for a 103 combination rejection. Furthermore, the requisite motivation is provided by the Davenport reference. On page 5 paragraphs 42-43 of the Davenport reference, Davenport teaches usage of a post-amplifier to amplify and limit the signal allows the receiver to reach lower the signal to noise ratio to a desirable level and allows the signal to occupy the majority of available dynamic range. The Davenport reference refutes the notion asserted by applicant on page 9 paragraph 6 that such a combination could only have been the result of hindsight with the motivation above as well as teaching that such post-amplification techniques and circuit designs are well known in the art (Davenport: page 5 paragraph 42).

Applicant also states on page 9 paragraph 5 that Davenports invention serve a different purpose very different than Epworths' invention. However, even if the two inventions serve different purposes, both inventions share the need for improving the quality of an electrical data signal. The portion of Davenport which uses post-amplification can be applied to quite a large amount of different technologies as long as that invention has the needed for further improving an electrical communication signal.

On page 10 paragraph 2 applicant states that Epworth does not teach a tunable local oscillator, however, Epworth clearly states that the amplitude of the local oscillator can be

directly tuned.(column 3 lines 19-22). Applicant states on page 10 paragraph 3 that Davenport does not disclose a gain clipped amplifier, however Davenport explicitly teaches that a rectifier that both amplifies and clips gain (page 5 paragraph 42 (the signal is amplified and limited)(page 5 paragraph 43 (the rectifier provides amplification and also performs threshold limiting by amplifying the signal to the rails of the amplifier))(page 6 paragraph 44 (circuitry for amplifying and limiting by clipping the signal)).

Finally, applicant states that the gain-clipped amplifier as taught by Davenport has different a different frequency range and level of wave rectification than the claimed invention, however frequency ranges and levels of rectification are not claimed and do not need to be within either of the specifications used in the rejection. It is also well known that optical communications have the ability to communicate in any frequency range including frequencies on the order of 100 Khz. Therefore, the rejection stands.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth J. Malkowski whose telephone number is (571) 272-5505. The examiner can normally be reached on M-F 8:30-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Vanderpuye can be reached on (571) 272-3078. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

KJM 3/5/07

KENNETH VANDERPUYE
SUPERVISORY PATENT EXAMINER